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IS 3606 (1998): Soil working equipment, Dischauow, Animal drawn - Specificaton [FAD 21: Farm Implements and Machinery]

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(दूसरा पुनरीक्षण)

Indian Standard
SOIL WORKING EQUIPMENT — DISC HARROW,
ANIMAL DRAWN — SPECIFICATION
(*Second Revision*)

ICS 65.060.20

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BUREAU OF INDIAN STANDARDS
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FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Farm Implements and Machinery Sectional Committee had been approved by the Food and Agriculture Division Council.

The disc harrow is a tillage implement used for the preparation of seed beds. The disc harrows drawn by animals usually have six or eight discs fixed in two gangs each gang having three or four discs. The gangs are mounted on a rigid frame on which a seat for the operator is provided. Often, these harrows have transport wheels to facilitate their movement from one place to other.

This standard was originally issued in 1966 covering the general provisions of disc harrow and some specific dimensions only for single action disc harrows. With the increase in use and manufacture of double action disc harrows (offset type) and with the publication of Specification for agricultural tillage discs it was revised in 1972. The revision of this standard has been taken up again to incorporate the requirements of plain spool which were earlier covered in IS 7256 : 1974. With the publication of this standard IS 7256 : 1974 will be withdrawn.

In the preparation of this standard assistance has been taken from ASAE S.290 'Determining the cutting width and the designated weight of disc harrows' issued by the American Society of Agricultural Engineers, USA.

The trade and manufacturing practices prevailing in the country have also been kept in view while preparing this standard.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2:1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SOIL WORKING EQUIPMENT — DISC HARROW, ANIMAL DRAWN — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard prescribes the material, dimensions and requirements for disc harrow (single action and double action offset type) drawn by animals.

2 REFERENCES

The Indian Standards listed in Annex A contain provisions which, through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated there.

3 TERMINOLOGY

3.0 For the purpose of this standard, the following definition in addition to those given in 4.1 to 4.3 of IS 9818 (Part 2) shall apply.

3.1 Ground Clearance

The vertical distance between ground and the lower edge of the disc, when the harrow is supported on transport wheels.

3.2 Width of Cut

The transverse distance between the top or bottom cutting edges of the end discs. For measuring width of cut gangs of the harrow shall be set at an angle of 18° (in case of offset type included angle of 36°).

4 TYPES

4.1 According to the setting of gangs, the animal drawn disc harrow may be of following types:

- a) Single Action Disc Harrow (*see* Fig. 1), and
- b) Double Action Disc Harrow (*see* Fig. 2).

5 SIZE

5.1 The size of the disc harrow shall be determined by the number of disc, size of disc and width of cut. The width of cut can be calculated by the following formula:

a) For Single Action

$$W = \frac{0.95 NS + 0.3 D}{1000}$$

b) For Double Action (Offset Type)

$$W = \frac{0.95 NS + 0.6 D}{1000}$$

where

W = width of cut (*see* 3.2) in m,

N = number of spaces between disc,

S = disc spacing in mm, and

D = diameter of disc in mm.

5.2 Some of the calculated values of width of cut are given in Table 1.

6 MATERIALS

6.1 The requirements of the material used for different components of the disc harrow shall be as given in col 3 of Table 2. As far as possible, the material shall conform to the Standards given in col 4 of Table 2.

7 ESSENTIAL REQUIREMENTS

7.1 The disc harrow shall fulfil the following requirements:

- a) Number of gangs — Two
- b) Number of discs — 3 or 4 in each gang
- c) Disc size (nom) — 355 or 405 mm
- d) Length of spool — 150 ± 2 mm
- e) Gang angle — Up to 24°

7.2 Hardness of plain spool shall be 160 to 220 HB (*see* IS 1500).

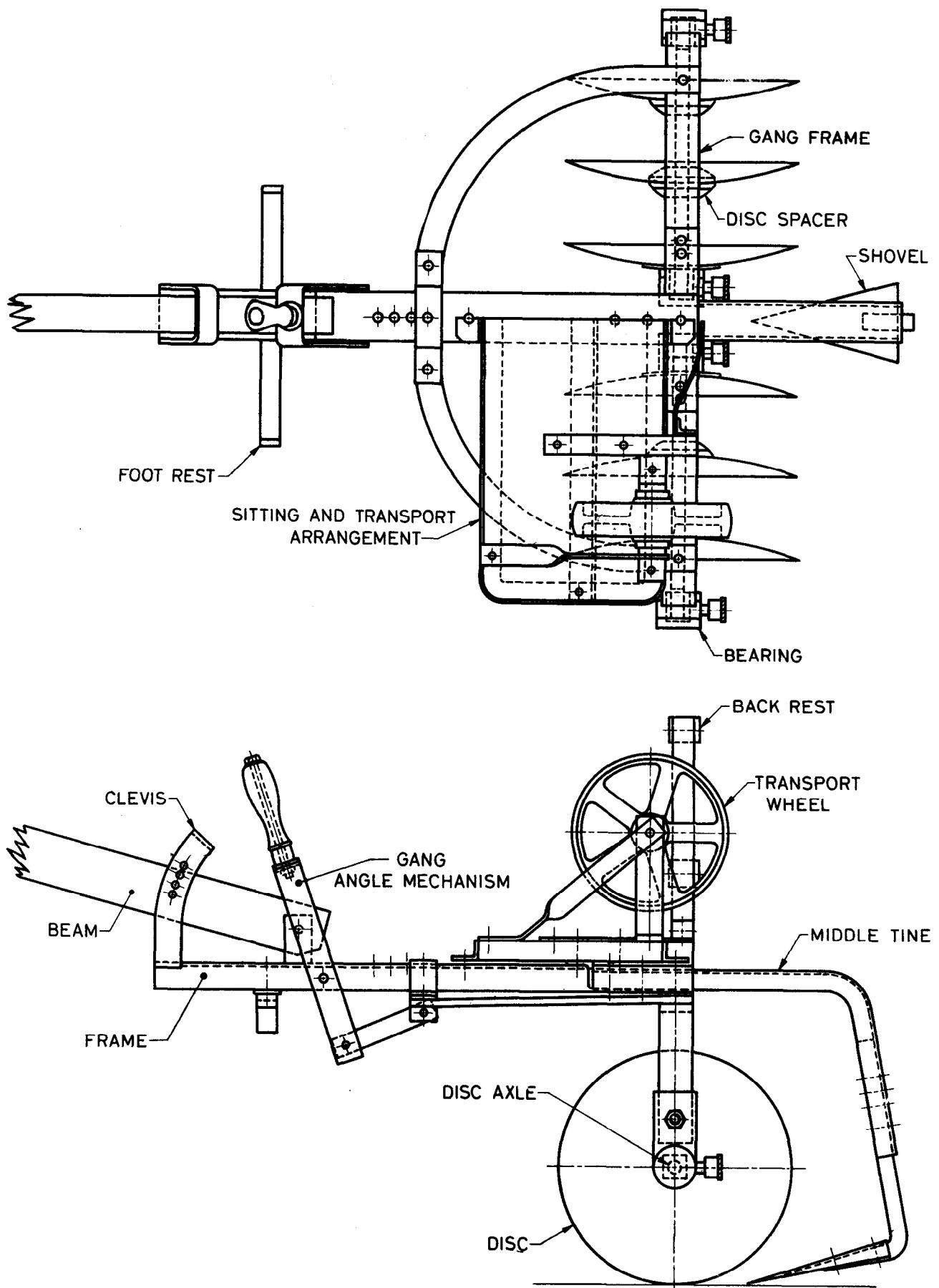


FIG. 1 DISC HARROW, SINGLE ACTION, ANIMAL DRAWN

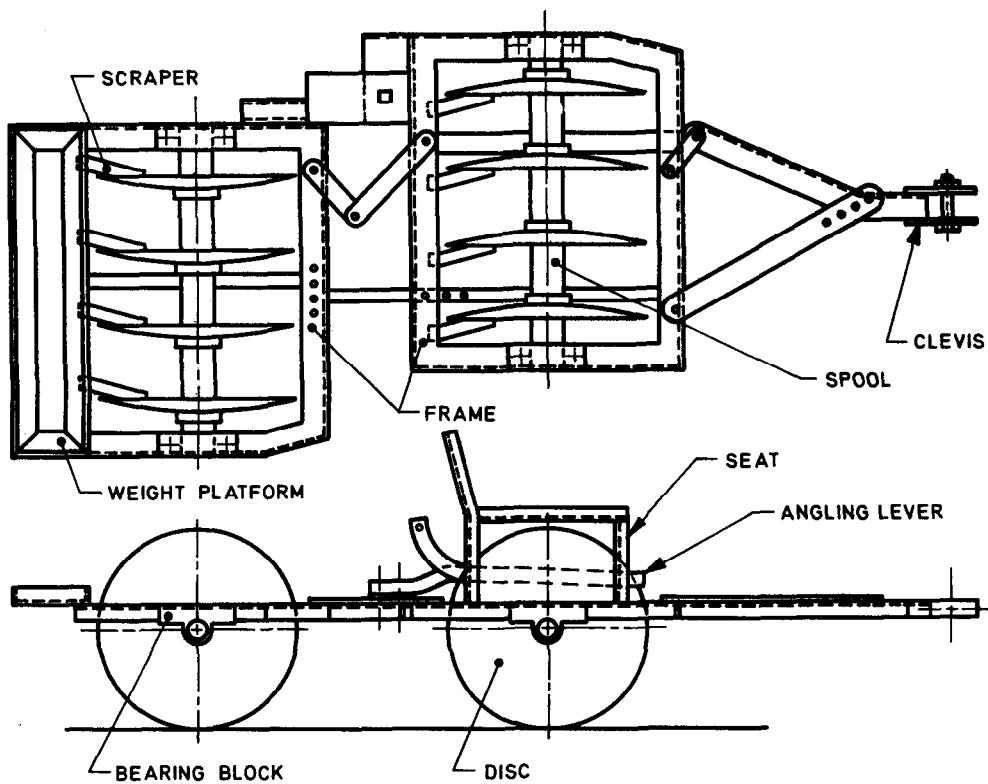


FIG. 2 DOUBLE ACTION OFFSET TYPE ANIMAL-DRAWN DISC HARROW

Table 1 Width of Cut of Harrows

(Clause 5.2)

Sl No.	Type	Disc Spacing mm (3)	Disc Size mm (4)	Width of Cut with	
				3-Disc Gang m (5)	4-Disc Gang m (6)
(1)	(2)	153.15	355	0.54	0.69
i)	Single action	153.55	405	0.56	0.70
ii)	Offset	153.15	355	0.65	0.80
		153.55	405	0.68	0.83

8 OTHER REQUIREMENTS

8.1 The disc used in disc harrow shall conform to all the requirements as stipulated in IS 4366 (Part 1).

8.2 The cross sectional size of gang axle shall be in accordance with the provisions given in IS 4366 (Part 1).

8.3 The dimensions of plain spool shall be as given in Fig. 3.

8.4 The frame should be rigid and strong.

8.5 Both faces of spool coming in contact with disc face should be finished for proper gripping.

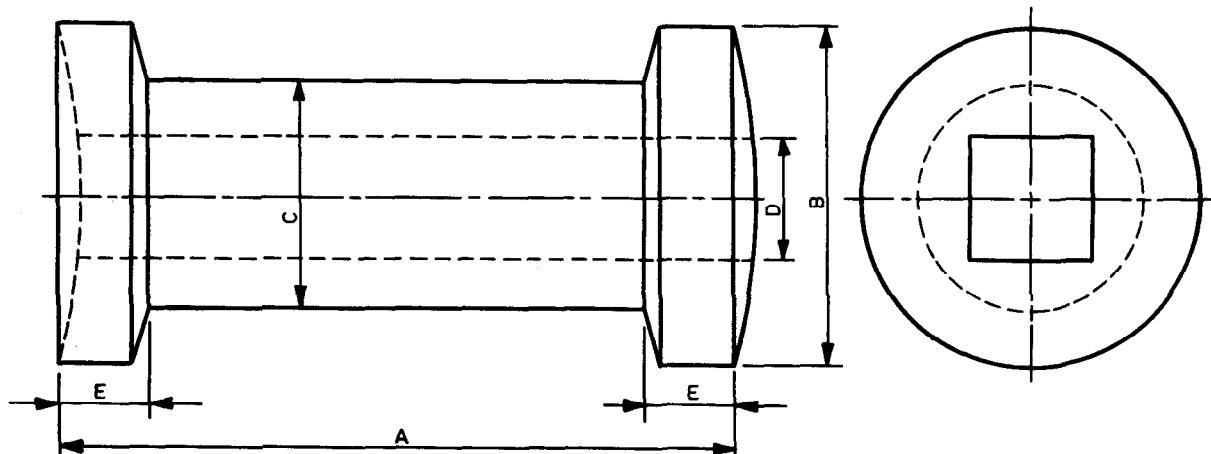
8.6 The gangs should be so attached that their angles can be easily changed to desired position with gang angling mechanism.

8.7 The scrapers should be sent in such a way that they should not touch the face of the disc and should be able to scrape the soil effectively. Arrangement for adjusting the scrapers shall be made.

8.8 The discs (in each gang) of the assembled harrow shall be firmly fixed among themselves by spool and there should not be any relative movement between disc and axle.

Table 2 Requirements of Material Used for the Different Components of Disc Harrow, Animal Drawn
(Clause 6.1)

Sl No.	Name of Component	Material	Applicable IS No.	Grade
(1)	(2)	(3)	(4)	(5)
i)	Frame	Mild steel	IS 2062	—
ii)	Scraper	Mild steel	do	—
iii)	Spool	Cast iron	IS 210	200
iv)	Gang axle	Mild steel	IS 2062	—
v)	Gang angling mechanism	Mild steel and/or steel tube	IS 2062 IS 3601	—
vi)	Bearing block	Cast iron	IS 210	200
vii)	Bearing	Cast iron or hard wood impregnated with oil or grease, or brass	IS 210 IS 399 IS 407	200
viii)	Washer	Cast iron	IS 210	200
ix)	Clevis/drawbar	Mild steel	IS 2062	—
x)	Transport wheel	Cast iron/ Mild steel	IS 210 IS 2062	200
xi)	Wheel standard	Mild steel	IS 2062	—
xii)	Seat	Mild steel and wood	IS 2062 IS 399	—
xiii)	Weight platform	Mild steel	IS 2062	—
xiv)	Beam	Sal wood	IS 399	—
xv)	Middle tine	Carbon steel	IS 1570	C55
xvi)	Middle shovel	Carbon steel	do	C55



A ± 2	B ± 2	C ± 2	D ± 1	E ± 2
150 115	75, 110, 65	50, 60, 65	27, 30, 32, 34	20, 25

All dimensions in millimetres.

FIG. 3 PLAIN SPOOL

8.9 Bush bearings of suitable materials as given in Table 2 impregnated with oil or grease should be provided. The bearing should be reasonably dirt-proof and properly aligned.

8.10 Adequate arrangement for lubrication of bearings shall be provided.

8.11 Requisite number of transport wheels should be provided for transportation of harrow from one place to another.

8.12 Adequate arrangement to take care of side thrust should be provided.

8.13 Operational manual and set of tools required to open the harrow for field adjustment should be provided.

8.14 For putting extra load, weight platform in the rear of offset harrow and on top of single action harrow shall be provided.

8.15 For the ease of operator, a seat with back rest should be provided.

8.16 In single action harrow provision may be made for attaching a shovel or sweep in the centre of two gangs in order to cut the uncut soil between two gangs.

8.17 In single action disc harrows to prevent the inside discs of the gangs from rubbing against each other, large concave washers (bumpers) may be provided. The bumpers should be shaped to fit the discs and should be able to prevent the discs from rubbing each other at any angle at which the disc gangs are set.

8.18 Proper hitching arrangement to connect the harrow with source of power should be provided. Hitch height should be adjustable in order to suit the height of animal.

9 WORKMANSHIP AND FINISH

9.1 The discs shall be finished as specified in IS 4366 (Part 1).

9.2 The welding of the various parts shall be satisfactory in all respects (see IS 822).

9.3 The components should be free from pits, burrs,

cracks, seams and other visual defects.

9.4 The hole for axle in spool shall be free from casting projection.

9.5 The exposed metallic parts shall be free from rust and shall have a protective coating which will prevent surface deterioration in transit and storage.

10 MARKING AND PACKING

10.1 Marking

Each disc harrow shall be marked with the following particulars:

- a) Manufacturer's name or recognized trade-mark, if any;
- b) Type and size;
- c) Batch or code number; and
- d) Year of manufacture.

These particulars shall be stamped, embossed or engraved on a metallic plate and rigidly attached on a non-wearing part of the disc harrow.

10.2 BIS Certification Marking

The disc harrow may also be marked with the Standard Mark.

10.2.1 The use of the Standard mark is governed by the provisions of *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

10.3 Packing

The disc harrow shall be packed to ensure safety of the parts in transportation as agreed to between the purchaser and the manufacturer.

11 SAMPLING AND CRITERIA FOR CONFORMITY

11.1 Unless otherwise agreed to between the purchaser and the supplier, the method of sampling and criteria for conformity given in IS 7201 (Part 1) shall be followed.

ANNEX A

(Clause 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	Title	IS No.	Title
210 : 1993	Grey iron castings (<i>fourth revision</i>)	3601 : 1984	Steel tubes for mechanical and general engineering purposes (<i>first revision</i>)
399 : 1963	Classification of commercial timbers and their zonal distribution	4366	Agricultural tillage discs : Part 1 Concave type (<i>second revision</i>)
407 : 1981	Brass tubes for general purposes (<i>third revision</i>)	(Part 1) : 1985	
822 : 1970	Code of procedure for inspection of welds	7201	Methods of sampling for agricultural machinery and equipment : Part 1 Hand tools and hand operated/animal drawn equipment (<i>first revision</i>)
1500 : 1983	Method for Brinell hardness test for metallic materials (<i>second revision</i>)		
1570 : 1961	Schedules for wrought steels for general engineering purposes	9818	Glossary of terms relating to tillage and intercultivation equipment : Part 2 Terms relating to equipment
2062 : 1992	Steel for general structural purposes (<i>fourth revision</i>)	(Part 2) : 1981	

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This Indian Standard has been developed from Doc : No. FAD 59 (682).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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